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SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE

A SCIENCE SERVICE PUBLICATION

PHYSICS

Cosmic Rays Analyzed

Particles of the lighter elements found by British physicists to be present in cosmic rays in vast excess of their previously known existence in the universe.

➤ THE COSMIC ray thinking of scientists will have to be changed again in the light of new observations revealed to the Royal Institution in London by Prof. C. F. Powell, F.R.S., of the H. H. Wills Physical Laboratory of Bristol University.

Prof. Powell disclosed that University of Bristol physicists, Drs. A. D. Dainton, D. W. Kent, and P. H. Fowler, have recently analyzed the mass spectrum composition of the cosmic rays bombarding the earth at a height of 95,000 feet. They found that, contrary to previous reports, the particles of the lighter elements, lithium, beryllium and boron, are present in vast excess of their known existence in the universe.

This is interpreted to mean that the cosmic rays reaching the earth are not representative of conditions at their points of origin and that the nuclei of the heavier elements have been in collision in their journey through space. These collisions cause the splitting of the heavy nuclei into smaller particles. As a result the lighter nuclei are found in such preponderance by the time the cosmic rays reach the earth's upper atmosphere.

Prof. Powell believes this new information may lead scientists back to an earlier theory of two pioneer American cosmic ray physicists, Dr. Bernard Peters and the late Dr. H. L. Bradt. This early theory proposed that the matter which is shot earthward to produce the cosmic radiation is initially "composed entirely of the heavier elements, possibly iron and nickel; and that the lighter nuclei, particularly those of hydrogen and helium, arise through the fragmentation of the heavy nuclei in collisions with interstellar hydrogen."

Iron and nickel are suggested as the parent elements of cosmic radiation because they are the heaviest elements so far observed shooting earthward out of space.

Prof. Powell points out the urgent necessity for gathering further cosmic ray information at heights in excess of 100,000 feet to get away from the interference of the molecules in the earth's atmosphere. Even at 90,000 feet the atmosphere is still sufficiently dense to exert a pressure of almost one-quarter pound per square inch.

At 120,000 feet the atmospheric pressure would be reduced to about one-fifteenth pound per square inch.

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ASTRONOMY

Clue to Age of Universe

Astronomer advises that age of universe can be figured out more exactly by making comparisons between near-by and distant clusters of galaxies.

➤ THE AGE of the universe can be estimated more exactly by comparing near-by and distant clusters of stellar systems or galaxies which contain hundreds of systems like the Milky Way galaxy to which we belong, points out Prof. Fritz Zwicky of Mount Wilson and Palomar Observatories of the Carnegie Institution of Washington and the California Institute of Technology, Pasadena, Calif.

The question of the age of the universe can be decided through the use of a new, powerful method, that of "dimensionless morphology." There is no need to probe painstakingly into space with conventional methods to discover about how old the universe is, Dr. Zwicky states. For a quick decision, the use of the 200-inch telescope will be necessary.

Astronomers interested in the universe's age should concentrate on near-by and exceedingly distant groups of galaxies, comparing them for number of galaxies and way in which the brightest ones are distributed in the groups, and for change of color among the individual galaxies, he remarked.

If the universe is only three billion years old and is expanding, we should be able to note changes taking place among these clusters of star-cities. Those farthest from us would have been expanding the least and should be the most compact.

Many theories about the age of the universe have been presented within recent decades. The shift toward the red end of the spectrum in the fanned-out light of a distant nebula has been interpreted by some to be caused by the external galaxies flying from us, the more distant receding the fastest. If this is true, a much smaller universe started flying apart about three billion years ago. Others hold that the universe is much older and only appears to be expanding.

"One of the easiest approaches to the problem of the age of the universe," Prof. Zwicky reports to the Astronomical Society of the Pacific, "lies in the investigation of objects whih could not possibly have existed in their present form in a much more contracted universe."

Regular and irregular clusters of galaxies, particularly clouds of such space-filling clusters of stellar systems, are of such tremendious size they could not possibly have existed as we know them in a small, compact universe.

"If we find at great distances many compact clusters of galaxies whose total population is considerably greater than that of the clusters in Coma, Perseus and Hydra, we may be on the trail of some evolutionary changes," Prof. Zwicky concludes.

Some sponsors of the short-age of the universe hold that the evolution of stars closely parallels the evolution of the universe. It will therefore be fruitful to compare in particular the frequency of supernovae, worn-out stars flaring up for the last time, in very distant galaxies with the frequency of such brilliant flare-ups in neighboring galaxies, the CalTech astronomer states.

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GEOLOGY

Find Unusual Phosphate Minerals in Brazil

➤ NEWLY-DISCOVERED occurrences of several uncommon phosphate minerals in northeastern Brazil have been reported by Dr. Joseph Murdoch, professor of geology at the University of California at Los Angeles.

Addressing geologists attending the Cordilleran section meeting of the Geological Society of America at the University of Southern California, Los Angeles, Dr. Murdoch revealed he had found such minerals as graftonite, lithiophilite, triplite, amblygonite and apatite in mine cuts where beryl and tantalite were mined during World War II.

The beryl and tantalite had originally been mined for use in steel production.

The phosphate minerals, however, are in the nature of geological oddities—they are found only in small quantities and have little or no commercial use.

The U. C. L. A. geologist said it was possible for him to visit far-flung pegmatite areas of the South American country because of the aid given him by the Brazilian government.

Some of the minerals found on his trip are still to be identified.

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ASTRONOMY

Supergiant Star Found

So big that its radius is more than eight times the distance from the earth to the sun and more than a thousand times the sun's radius. Yet it is not the brightest.

➤ A STAR so gigantic that its radius is more than eight times the distance from the earth to the sun and its diameter is more than 1,500,000,000 miles has been detected by Dr. Harlow Shapley, director, and Mrs. Virginia McKibben Nail of Harvard College Observatory.

Six stars a billion miles across, and thus so gigantic that if centered on the sun they would overflow the orbit of the planet Jupiter, have been found by the Harvard scientists in their study of the superluminous and supergigantic stars of the universe. Their findings are reported in the PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES (March).

The brightest star in the universe so far as now recorded is the well-known bluish variable star S Doradus. It is half a million times more luminous than the sun, and its brightness is exceeded only by the bursts of supernovae, the brightest of "new stars," reports Dr. Shapley.

These biggest and brightest stars in the universe have been found in the Small and Large Clouds of Magellan, so far south that they are never seen from the United States. These groups of hundreds of millions of stars are among the nearest of galaxies beyond our own Milky Way system. To the unaided eye they look like detached portions of the Milky Way.

In the Smaller Cloud Dr. Shapley and Mrs. Nail have found over 20 stars which, if placed no farther away than Sirius, the brightest star in the heavens, would be a hundred times brighter than this dog-star.

The faintest of these 20, if placed about two hundred million million miles from the earth, would be brighter than the planet Venus as seen in the early evenings about now; the brightest of these would be about three times as bright as Venus at its very brightest.

The brightest star in the Small Magellanic Cloud is 25,000 times as bright as our sun. Yet 20 of these would be needed to shine as brightly as S Doradus, most luminous star in the universe.

These stars in the Small Magellanic Cloud, however, are known to be bad radiators. Therefore the brightest ones must be enormous in order to give forth as much light as they do to be picked up with moderate-sized telescopes. They are far larger than the biggest stars of similar types yet measured in our own system.

In variability and color, and presumably in surface brightness, some of these Magellanic stars resemble Betelgeuse, bright star in the constellation of Orion and with a diameter 400 times the sun's. Yet they are several times brighter and their radi are a couple of times longer than such supergiants as Betelgeuse and Antares, the latter the gigantic red star in Scorpio constellation.

Other supergiant stars, so large that the planets Mercury, Venus, earth, Mars and Jupiter could all revolve around inside them in their customary orbits, some day will undoubtedly be found in the Large Cloud of Magellan, Dr. Shapley predicts. They probably also exist in our own galactic system, but to date none has been detected or measured.

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MEDICINE

Corticosterone Successful

➤ A NEWLY manufactured drug related to the famous arthritis remedy, cortisone, has proved successful in first trials of it as treatment for the very serious illness called Addison's disease.

The new chemical is called Corticosterone. Like cortisone, it comes from the adrenal glands. And, again like cortisone, only extremely small amounts of it are as yet available.

The good results in treatment of four patients suffering with Addison's disease were announced by Dr. Jerome W. Conn, professor of internal medicine at the University of Michigan.

Addison's disease has been rapidly increasing in the United States, Dr. Conn stated. The disease is caused by failure of the adrenal glands to produce enough of the hormonal substances needed to keep an adequate balance in the body of salt, potassium, water, sugar, protein and other elements. Patients suffering from this disease are weak, thin, have poor appetites, low blood pressure and a peculiar darkening of the skin. They must be treated with hormonal substances all their lives, or they die of the disease.

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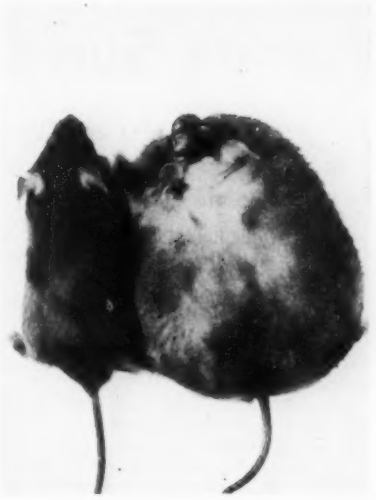

INHERITED FAT—Difference between mouse obese by inheritance and normal mouse is shown in this picture.

GENETICS

Find First Evidence for Inherited Obesity In Mice

➤ NOW mamma mouse, just like many a human mother, can blame her offspring's fatness on inheritance from their grandparents.

For the first time, evidence of a hereditary obesity in mice has been discovered. The hereditary trait is a recessive, and it is also the first evidence for such a trait in any animal other than man.

The trait is a new mutation. Mice that get fat as a result of it are themselves sterile.

The new mutation was discovered by Ann M. Ingalls, Margaret M. Dickie and Dr. G. D. Snell of the Jackson Laboratory, Bar Harbor, Me. Reporting in the JOURNAL OF HEREDITY (Dec.), Mrs. Ingalls and associates point out that fatness, other than that occurring in crosses with yellow mice, is relatively rare in mice.

"In the summer of 1949," the scientists report, "some very plump young mice were found in the V stock. Others occurred shortly after that among offspring of those V stock animals that had been outcrossed to the fuzzy stock.

"Obese animals are first recognizable at about four to six weeks of age. At that time they appear to have a slightly shorter body, are rather square and have expansive hind quarters.

"From that time on they increase in weight rapidly, so by three months of age they weigh about twice as much as their non-obese litter mates."

How long the fat mice will live is not known. None has died up to one year.

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ASTRONOMY

Pursue Sun's Last Mystery

Astronomers confident that every chemical element in the sun can be found here on earth, although form might be obtainable only in atom bomb heart.

► THE LAST mystery as to the chemical composition of the sun's atmosphere is now being pursued by scientists, it was learned from Dr. Walter Orr Roberts, astrophysicist of the High Altitude Observatory of Harvard University and the University of Colorado.

Astronomers are now completely confident that every chemical element in the sun can be found here on earth, even though their form is frequently unobtainable here on earth except possibly in the heart of an atom bomb. There is one major line in the fanned-out light of the sun's atmosphere, however, that remains to be identified as some form of terrestrial element.

This unidentified line is bright yellow. It is seen only during an eclipse of the sun, and is not always present then. It usually appears as short-wave radio broadcasts are suddenly and unexpectedly blacked out.

Positive identification of this line is important to understanding the rapid movement of the gases in the sun's atmosphere. It would also help to explain the regions of abnormal temperatures in the solar atmosphere.

The yellow line, instead of being sharp, is quite fuzzy at the edges. It shows up when prominences, those huge clouds of atmospheric gas extending high above the sun's surface, can be seen moving at tremendous speeds, sometimes up to 300 miles a second.

"This line probably represents some kind of missing link between prominences and the sun's corona or outer envelope," Dr. Roberts points out. He was in Washington to speak before the Smithsonian Institution.

This erratic line was discovered by the French astronomer B. Lyot 15 years ago during a man-made eclipse. It has probably never been seen during a natural eclipse, but has been noticed and studied with great detail with a coronagraph.

Embarking on an intensive study of this yellow line, Dr. Roberts is rounding up all previous observations, a large majority of which he made at Climax. He is looking for peculiarities connected with its appearance.

The canary-color in the sun's spectrum may be found to appear suddenly and fade out gradually. It may be seen only when there is extreme activity such as prominences and sunspots on that portion of the sun. It may even be a clue to regions of abnormally low temperature in the sun's corona. Astronomers may discover that when this special yellow hue appears in the sun's spectrum, the "forbidden" red line becomes most intense. Whatever the findings, interpretation would be necessary.

For decades, the bright red and green lines in the sun were believed due to a mysterious element, named "coronium," present in the sun but unknown here on earth. Then less than a dozen years ago the distinguished Swedish astronomer, Bengt Edlen, succeeded in identifying these lines as due to gaseous iron, nickel and silicon raised to such high temperatures that they were stripped of about half their electrons.

This yellow line, found quite near the yellow sodium line, has tentatively been identified as calcium stripped of many electrons. But this places the temperature much too high for the gases causing this line to be connected with a prominence, Dr. Roberts complains. So search for another element which would cause the yellow line at the temperature known to exist in prominence is under way.

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MEDICINE

Cancer Chemistry Probed

Discover fundamental difference in body chemistry between cancer patients and normal women. May show why hormone treatment effective against breast cancer.

➤ A FUNDAMENTAL chemical difference between cancer patients and normal women has been discovered by Drs. Erwin Schwenk and N. T. Werthessen of the Worcester Foundation for Experimental Biology, Worcester, Mass.

The difference is a fundamental one because it is a difference in the machinery of body chemistry. Other scientists have found differences in the results of body chemistry between cancer patients and normal persons, but this is believed to be, with one exception, the first difference discovered in body chemistry mechanism in cancer.

The discovery is related to female hormones and may lead to better understanding of why female hormone substances are effective in treatment of some breast cancers.

If the female hormone chemical, estrone, is put into the blood of young women or girls, something in their blood makes the hormone disappear. The Worcester scientists cannot detect it by their testing methods.

If this chemical is put in the blood of normal women past middle age, it stays there. And if it is put in the blood of women past middle age who have cancer, it disappears, as it does in healthy young women.

The Worcester scientists think the disappearance of the hormone chemical is due to an enzyme, but they are not sure of this yet. Further research, they hope, will clear up this point and perhaps lead to more effective cancer-fighting.

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TECHNOLOGY

Test Food Processing In "Pilot Wing"

➤ A SO-CALLED "pilot wing," where research can be conducted under simulated commercial conditions, will be outfitted with machinery and equipment for duplicating any process now in use by the food industry.

It is a major feature of the new $1,000,000 Food Technology Division building to be completed next fall at the University of California's College of Agriculture, Davis, Calif. The wing will serve as a laboratory for instruction of students in semi-commercial operations and for practical application of research. Numerous food processes will be studied and practiced—such as dehydration, freezing, canning, evaporation, pickling and packaging.

The wing will also be used to run cooperative tests on new varieties of fruits and vegetables developed by other divisions of the college. These new varieties will be put through trial packs to test their potentialities as commercial products.

The cold storage and incubator rooms will enable technologists to make tests under greatly varied conditions. Deterioration of fresh and processed foods under long and short-term storage at different temperatures can be observed.

Humidity-control tests can also be made. For example, the relative loss of weight by apples stored in different humidities and temperatures can be measured.

The incubator room will be used for culturing yeasts, bacteria and viruses for experimental work.

A relatively new concept of checking the acceptability of foods will be employed in the food-tasting section. When foods are to be tasted, a special air conditioner will keep the room clear of foreign odors. Each taster will be in a small cubicle so that he cannot see other tasters. Facilities for controlling color of light will also be used to reduce possibilities of influence by color of foods.

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ROAM FAR—Baby Florida spiny lobsters, almost transparent at this stage of development, have been found to travel many hundreds of miles from their spawning place to the sea bottom where they grow to maturity.

MARINE BIOLOGY

Baby Spiny Lobsters Roam Far To Grow Up

➤ BABY spiny lobsters have the wanderlust, so it would seem, for marine scientists have found they may travel many hundreds of miles from their place of birth to the sea bottom where they grow up.

The story of these infant ocean travelers and of other marine life is now being unraveled through study of the tiny plants and animals drifting in the Gulf Stream's warm current. Fine mesh nets are towed from a ship to bring up hundreds of kinds of microscopic sea life, lumped under the general name of plankton.

The long-legged baby lobsters, looking somewhat like spiders, are transparent. When in water all but their pigmented eyes disappear. Twelve stages in the infant lobster's life have been studied so far.

The net-fishings that bring up the great variety of Gulf Stream marine life are a part of a year-round plankton research project directed by Dr. F. G. Walton Smith and Dr. Hilary B. Moore, of the University of Miami Marine Laboratory. The project is sponsored jointly by the University and the National Geographic Society.

The role of plankton in the ocean's economy is still a mystery. Drifting plankton pastures are as necessary for good fish nutrition as grasses and vegetation are for land animals.

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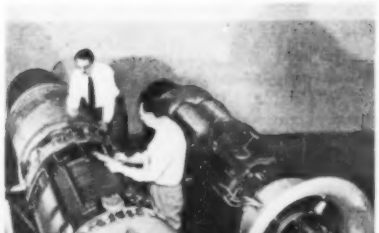

JET ENGINES—Although these two jet engines have equivalent diameters, the new Allison J35-A-23 on the left is much more powerful than its predecessor, yet fuel consumption has been cut considerably. Looking over the engine are Henry Devaney, engineer, and Frank Herdrich, foreman.

AERONAUTICS

Four New Jet Engines Do Work of Six in B-47

➤ A NEW version of the U. S. Air Force B-47 jet-propelled bomber is expected to have greatly increased range with a new jet engine developed by the Allison Division of General Motors, Indianapolis. Four of the new engines will do even more work than the six used in the present B-47 Boeing Stratojets, saving weight and fuel.

The four engines will deliver a great deal more power than the six engines now in use, Allison engineers declare. They effect a great saving in engine weight, together with substantially improved fuel economy. The new engine is dubbed the J35-A-23. The plane in which it is to be used in its first applications is the XB-47C. The first experimental model is scheduled to fly later this year.

The new super-jet is described as an "all-weather" engine, incorporating de-icing features on the air inlet vanes and the bullet nose of the air intake. An automatic ice detector also is supplied. Heat for the de-icing is taken from the compressor.

The engine also features what engineers call a "cannular" combustion section. Its outer combustion chamber is a single can similar to an annular type burner section. But within it are ten individual cans, and compressed air flows from the outer can into the inner liners for combustion. This unusual construction adds to the structural strength of the engine and contributes to the ease of assembly.

The new engine has the same outside diameter as present Allison jets so that it can be used to replace older models if space is available to accommodate its longer length. Its overall length is 172 inches. A special feature is that it has 16 axial stages of compression with a three-stage turbine. Entirely independent of external oil supply, the J35-A-23 has its own complete oil system.

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METEOROLOGY

Weather Control Remote

Recessed hearings demonstrated that scientists have long way to goal of artificial control of weather by man. Research by government and private industry continues.

➤ GOVERNMENT control of weather is still a long way off. Net result of Congressional hearings on rainmaking, now recessed, is that scientists demonstrated they have not yet arrived at any answers as to the feasibility of artificial control of the weather by man.

Western ranchers and farmers are spending hundreds of thousands of dollars on efforts to make rain. Many of them swear this money was well spent. But, the Weather Bureau, backed by nearly 100 years of records and research, will usually tell them that it would have rained anyway.

Most proponents of rainmaking will say that they can only make rain when weather conditions are such that it would have rained a little anyway. The honest ones deplore the wholesale commercial rainmaking efforts in the West. Many of the commercial rainmakers, they say, are inexpert, many of them pour too much silver iodide into the air, therefore actually preventing it from raining when it should have rained.

Congressional sources report that this year there has been a signal dropping off of mail from those voters who should be most interested in rainmaking. Last year, they say, letters poured in from water users all over the West, urging government action. This year, there are few such letters.

This leads them to believe that none of the three major bills looking toward control of rainmaking will be passed during this session of Congress. One sets up a new Weather Control Commission patterned after the Atomic Energy Commission, another puts research and control in the Interior Department, another in Agriculture.

Some method of hampering charlatans who charge high prices for purportedly making rain, however, may come out of this Congress. Not only does it not usually pay off for those who spend the money for it, but also it usually interferes with serious scientific research in rainmaking.

In the meantime, serious research in the artificial control of the weather by man will probably be carried on by different and, in many cases, competitive private and governmental agencies. Out of this seeming chaotic pattern may come, eventually, the real answers.

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ZOOLOGY

Texas Bird Cools Self

➤ WHEN one of those scorching summer days arrives, how would you like to cool off just by opening your mouth?

That is what the Texas nighthawk does, according to Dr. Raymond B. Cowles and William R. Dawson of the University of California at Los Angeles.

These West Coast zoologists have discovered that this particular species of bird has a special cooling mechanism in its mouth that allows it to sit all day in the hot desert sun while protecting its eggs.

Since the nighthawk has no sweat glands, cooling is taken care of mostly through its mouth, which comprises more than 15% of the total body area.

"The nesting activity of this bird takes place in June when the temperatures on the desert are ranging above 100 degrees," said Dr. Cowles. "The eggs are incubated in the open where heat would rapidly kill the embryos; therefore the adult bird must remain in the open to shield its eggs."

When its body temperature reaches an uncomfortable point, the nighthawk opens its mouth and begins "fanning" with a set of muscles near the throat. Evaporation of moisture covering the oral surfaces lowers the temperature of a large amount of blood which has filled the mouth vessels for cooling.

"Temperature control of this nature means an extravagant amount of water loss, but the Texas nighthawk sits it out on the hot desert all day, only soaring in search of water after sunset," said Dr. Cowles. The observations are reported in CONDOR (Jan.-Feb.).

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NEUROLOGY

Spinal Cord Paralysis

Studies of regeneration of spinal cord nerve cells by fever bouts may become first steps toward overcoming paralysis of damaged spinal cords.

➤ STUDIES that may become the first steps toward overcoming paralysis from bullet-shattered or otherwise damaged spinal cords were reported by Drs. C. D. Clemente, W. W. Chambers, Leon Greene, S. Q. Mitchell and W. F. Windle of the University of Pennsylvania at the meeting of the American Association of Anatomists.

Nerve cells within the spinal cords of grown cats and dogs can be made to regenerate after the spinal cord has been completely cut across, these scientists have discovered.

To accomplish this, scars of connective tissues must be checked or prevented, and a loose matrix of reticular and macrophage cells substituted. Fever-causing substances from certain bacteria help accomplish this condition.

When a fever-causing substance, called Pyromen, was given in repeated bouts and this treatment kept up, scars did not form and some nerve fibers grew across the cut in the spinal cord. But animals that got only two or three bouts of fever followed by long periods of no treatment had scar tissues begin to form again.

By continuing the Pyromen treatment over a long period, the scientists hope to find that nerve function will become regenerated in the animals. If this does result, it might show a way to treat humans whose spinal cords have been cut by war wounds or in civilian accidents.

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RADIO

Radar Directs Artillery

➤ AN IMPROVED radar fire-control system, which will automatically aim anti-aircraft artillery, contains an electrical "thinking machine" that calculates where a shell should be exploded to bring an enemy airplane down, and automatically aims the gun to do just that.

It is a development by Bell Telephone Laboratories and actual construction is by the Western Electric Company, manufacturing unit of the Bell System. Production is under a contract with the U. S. Army Ordnance.

The new system is an outgrowth, with many radical improvements, of the Bell Telephone Laboratories electrical gun used effectively in World War II. In it, radar found and tracked a hostile plane, and fed continuous information into an "electrical brain" computer. At the same time, data relating to wind velocity, muzzle velocity of the shells, temperature and similar factors were fed into the computer. Based on all this information, the "brain" automatically aimed the gun in the correct direction.

The new fire-control, adaptable to firing either 90 mm. or 120 mm. anti-aircraft batteries, operates on the same general principle but incorporates many improvements and refinements which assure greater effectiveness and flexibility. Details of the new system are classified for security reasons.

However, many of the basic principles of fire-control systems are similar to those employed in the complex switching mechanisms which underlie the dial system of the modern telephone network. Many of the components of the intricate computer which is the heart of the fire-control system, such as switches, relays, vacuum tubes and wave guides, are also found in the telephone system.

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PHYSIOLOGY

Human Brain Kept Alive One Week Outside Body

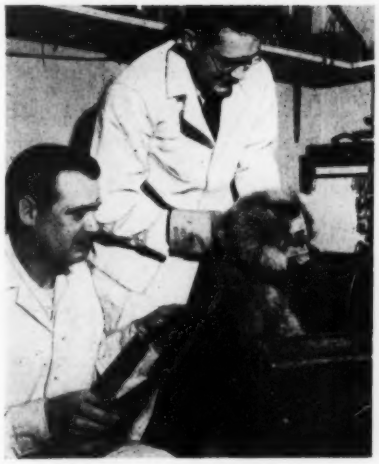
➤ SMALL pieces of adult human brains have been kept alive outside the body for as long as a week at a time, Dr. Mary Jane Hogue of the University of Pennsylvania reported to the American Association of Anatomists, Detroit.

The human brain pieces were kept alive on a medium of chicken blood plasma, chick embryo extract, human placental serum and a special salt solution called tyrode solution.

The pieces of grown-up brains did not show the "wealth of cell processes streaming out" from them that were shown by pieces of brain from unborn babies which Dr. Hogue previously had kept alive outside the body.

Nerve cells, although they were not seen dividing, showed other phenomena of life and lived as long as a week at a time.

Science News Letter, March 31, 1951



WEATHERING COLD—Study of such animals as the whistling marmot —so named because of his shrill whistle when alarmed—is helping scientists to learn the secrets that enable these animals to withstand subzero weather. Here Prof. Peter R. Morrison and Fred Ryser are placing the marmot in a respiration chamber to measure the oxygen consumption rate.

ZOOLOGY

Animals Studied for Ways To Beat Severe Cold

➤ HELP for humans in withstanding severe Arctic cold is expected from a study of how Alaskan animals stand below-zero weather without freezing.

The heat-generating capacities of Alaskan animals are being compared with those of animals accustomed to warmer climates by Dr. Peter R. Morrison, University of Wisconsin zoologist, and associates. Cold-climate species seem to have better heat regulatory systems than species limited to warmer regions.

The lemming and blue fox, for example, are so specialized in adaptation to cold that they are limited in range to the Arctic. One lemming under observation ran a fever about 10 degrees over normal and died of heat prostration at an air temperature of only 77 degrees Fahrenheit.

University of Wisconsin zoologists have made metal casts duplicating the bodies of the various animal species. Hides are fitted over them. Electric heaters in the casts and recording thermometers enable the scientists to determine how efficiently various fur types insulate from outside cold.

Science News Letter, March 31, 1951

RADIO

Television Transmitter Is Carried on One Man's Back

➤ TELEVISION has gone pickaback. A camera and a portable transmitting station, designed as a one-man back-pack unit, was described to the Institute of Radio Engineers.

This back-pack station is planned to function with its own battery-power supply, stated L. E. Flory of the RCA Laboratories where the equipment was developed. It has a range of approximately one mile. The transmitter operates in conjunction with a control station which may be located a mile away.

Signals corresponding to the scene being televised are transmitted to the control point on an ultra-high frequency with a power of two watts. In addition to acting as a monitor for the televised picture, the control point sends out a stream of pulses which stabilizes the camera and can also be used to issue vocal instructions to the cameraman.

The back-pack is carried knapsack fashion, with sending antenna extending from the top. It is an adaptation of the RCA industrial TV camera using the vidicon tube. The equipment contains 42 tubes which, with their associate circuits, provide all frequencies for a standard 525-line, 30-frame interlaced television picture. A single battery operates the station for about one and a half hours.

Science News Letter, March 31, 1951

RADIO

Radio-Guided Lifeboat Rescues Ocean Survivors

➤ UNMANNED lifeboat, that under remote radio control rushes around to survivors in the sea, has been developed at the Wright-Patterson Air Force Base, Dayton, Ohio. It will be standard equipment in some types of Air Force planes in less than a year.

It is designed for air transportation and is dropped from a plane by parachute. After it hits the water, its engine is started and its direction determined by radio signals sent by an operator in its mother plane.

The boat is of all-metal construction, measures 30 feet in length and is designed to carry 15 men. It is powered by a four-cylinder, water-cooled engine, housed in a water-tight compartment. A massive 100-foot parachute is used in the dropping.

When the boat hits the water, the chute is jettisoned by an explosive charge. A sea anchor goes out with the chute and holds the boat in position. After the chute is jettisoned, the operator in the plane takes over. He uses a five-frequency transmitter which is matched by a five-frequency receiver in the boat.

His first signal releases the stabilizing fins which hold the boat steady in descent, frees the rudder, opens the engine's air vents and cranks the motor. When the motor is running at a fast idle, the sea anchor is released. The boat then travels forward and to the right or the left under radio control by the operator.

The operator stops the boat when it comes to the survivors' raft, and idles the motor while they board. The boat itself is equipped with duplicate controls which enable survivors to break off the radio control and take over when ready. The system was developed by Air Force scientists and built by Westinghouse Electric Corporation.

Science News Letter, March 31, 1951

NEUROLOGY

Tickling Tadpole's Back Aids Study of Nerves

➤ TADPOLES that scratch their bellies when their backs are tickled are giving scientists more knowledge about the action of the nerve fibers in the skin that are responsible for feelings of touch, heat and the like.

The reverse action tadpoles were reported by Dr. Nancy Miner of the University of Chicago at the meeting of the American Association of Anatomists, Detroit.

Dr. Miner cut a narrow strip of skin from near the mid-back to near the mid-belly lines of the tadpoles. These skin strips were then rotated 180 degrees and replaced. The grafted strips developed typical coloring of their original location, in spite of being in reversed positions.

After metamorphosis Dr. Miner touched the white belly skin on the tadpole's back. By reflex action the tadpole rubbed its belly with its forelimb. When she touched the back skin which was now on the belly, the tadpole aimed its hindlimb at its back to rub or scratch the place touched.

When the skin on the sides which had been left in its original place was touched, the tadpole aimed correctly to rub the touched spot.

Science News Letter, March 31, 1951

ZOOLOGY

Rabbits Don't Necessarily Have Gallbladders

➤ RABBITS DO NOT necessarily have gallbladders. This organ was lacking in more than 10% of rabbits in one family line of New Zealand Whites and in about 6% of 1,275 hybrid bunnies selected at random, Dr. Paul B. Sawin of Jackson Laboratory, Bar Harbor, Me., reported to the American Association of Anatomists, Detroit.

When they do have gallbladders, the size of the gallbladder may vary from very small to longer than the length of the animal's liver lobe.

Science News Letter, March 31, 1951

IN SCIENCE

GENERAL SCIENCE

Cod Liver Oil Rivalled By Vitamin A Manufacture

➤ A NEW two-million-dollar factory to rival the cod, the shark and other fish has been built by Chas. Pfizer and Co., Brooklyn, N. Y., chemical firm, in Groton, Conn.

The plant will be used to produce crystals of vitamin A. This is one of the two vitamins for which generations of children have taken cod liver oil and other fish liver oil. Vitamin A is particularly important for health and normal growth in childhood and for eye health at all times.

Synthesis of vitamin A crystals was accomplished on a laboratory scale during the early part of World War II. Synthesis on a commercial scale proved difficult because the crystals were so sensitive to the destructive action of air and humidity.

This difficulty has been overcome by Pfizer's chemists. They make the vitamin crystals stable by coating them with gelatin. The gelatin-coated crystals will stand storage for three years under normal conditions.

Vitamin A has been available in soft gelatin capsules. But many people prefer swallowing a tablet, or pill as it is popularly known, to swallowing a capsule. The new dry form of the vitamin will make it possible to put it up with other vitamins in multi-vitamin tablets, instead of capsules.

The new plant, John E. McKeen, Pfizer president, said, will be able at full capacity to produce one-half the total U. S. civilian and military need for vitamin A.

Science News Letter, March 31, 1951

INVENTION

Patent Cigarette Pocket For Swimming Trunks

➤ THAT desire for a cigarette next summer—when the swimmers are on the diving float—may be satisfied. Swimming trunks with a waterproof pocket have been invented.

The pocket, made of rubberized fabric, can carry car keys, money and other small articles, as well as cigarettes and matches.

In addition, the pocket is reversible and the wet bathing trunks may be put inside it for carrying after the swim. The inventor, Ferdinand Kowatsch, Chicago, has designed a slide fastener with handles on each side so that the trunks' pocket can become a carrying case. He received patent 2,544,840 for his invention.

Science News Letter, March 31, 1951

ENCE FIELDS

DENTISTRY

Foresee Tooth Banks from Transplantation Attempts

▶ TOOTH BANKS, where a person who lost a tooth could get a tooth bud that would grow in his jaw into a full-sized permanent tooth, are a possibility for the future.

The beginnings of teeth have been successfully transplanted in cats by Dr. Harry H. Shapiro, assistant professor of anatomy at Columbia University's College of Physicians and Surgeons.

The buds of developing permanent teeth in cats have been successfully transplanted from the jaw of one cat to the jaw of another as well as to a different place in the jaw of the same cat.

Dr. Shapiro makes it clear there is no assurance his results can be applied to humans.

However, dentists recall one case reported of successful tooth bud transplantation in humans. In this case a third molar, or wisdom tooth, bud was transplanted into the socket of a first molar tooth.

Tooth bud banks for humans would pose a supply problem. Presumably they would have to come from the jaws of children who died of accident or some sickness.

Science News Letter, March 31, 1951

GEOGRAPHY

For Success, Choose Birthplace Carefully

▶ IF you want to be a success in life, choose carefully the place where you are born, as well as your parents.

This advice was offered indirectly by Dr. Stephen S. Visher, professor of geography at the University of Indiana. Your present place in the community and economic status may be due indirectly to the geographical location of the town in which you were born, he told the Association of American Geographers meeting in Chicago.

Dr. Visher reported on a detailed study of leading Americans born and reared in Indiana, in which he found that more leading scientists were born in certain sections of the state than in other sections. Prominent persons listed in "Who's Who in America" and "American Men of Science" were selected for the study.

"The areas which yield the most notables are those which contain the most mentally alert, ambitious, persistent and energetic people possessed of high ideals," Dr. Visher stated. "Such people seek opportunities to use their abilities, they appreciate congenial associates and therefore congregate in desirable towns and in choice residential districts or in suburbs."

He reported that the southwestern sixth of the state of Indiana possessing the longest hot summer yielded far fewer notables proportionately than the opposite corner of the state, which is the coolest.

Families of professional men, Dr. Visher reported, produce twice as many distinguished offspring as the families of business men; 20 times as many as farmers; 45 times as many as skilled laborers and 1,000 times as many as unskilled laborers.

Science News Letter, March 31, 1951

MEDICINE

Thyroid Cancer Responds To Hormone Treatment

▶ FOR the first time in medical history, a case of cancer of the thyroid gland in the neck has responded to treatment with male hormone.

The patient, a 53-year-old woman who had been sick with thyroid cancer for nine years, has left her sick bed and has been leading a routine normal life for the past eight months since the hormone treatment.

These good results do not mean that the patient has been cured, warns Dr. Henry M. Lemon of Boston University in his report to the American Cancer Society.

"The patient's bones still are shot through with cancer," he stated. "There is no telling whether any of this can be cleared up and, if so, how long the remission will last."

Large doses of X-rays had previously been tried without success. The cancer did not pick up radioactive iodine, as some thyroid cancers do, so that treatment offered no hope.

Scientific interest in this case, Dr. Lemon pointed out, centers on the opportunity to study just what effect the male hormone has on protein synthesis in thyroid cancer.

Science News Letter, March 31, 1951

METEOROLOGY

Water in Air Studied To Learn About Storms

▶ THE WATER in the air of North America is being investigated by a team of Baltimore meteorologists from Johns Hopkins University. The objective is to discover more about the birth and development of storms, to devise better methods of forecasting rain and clouds, and find out about the immense amounts of moisture in the air as vapor.

Because weather predicting is necessary for air and ground troop operations in war, funds for the research, directed by Prof. George S. Benton, are provided by the U. S. Air Forces.

Science News Letter, March 31, 1951

INVENTION

Sea Water for Irrigation By Chemical Treatment

▶ WATER suitable for irrigation purposes is claimed obtainable from the salty ocean by a chemical-treatment process on which William A. E. Hult of San Diego, Calif., received patent 2,546,071 from the government. The product is not suitable for household or drinking purposes because of the new chemicals formed.

Sodium chloride, the principal salt in sea water, is converted into sodium nitrate, which remains in the irrigation water and adds plant food to the soil. Also formed is silver chloride, a precipitate easily removed.

To bring about this chemical action in the sea water, silver nitrate is added to it in an agitator. Then, to recover the silver chloride, the water is passed through a "rifle barrel" type sluice pipe and into a settling tank from which it is drawn to the garden.

If desired the new water may be evaporated so that the sodium nitrate may be recovered as a commercial product. The silver chloride from the sluice pipe and settling tank may be refined, and it may have an enhanced value because it may contain some of the metals in sea water.

Science News Letter, March 31, 1951

EMBRYOLOGY

Embryos Show Prebirth History of Baby Cobra

▶ HOW a baby cobra looks before hatching out of its egg can now be seen in a series of embryos of the dreaded king cobra just added to the Smithsonian Institution reptile collection.

The prebirth history specimens were collected by Maj. Robert Traub and Lieut. Vernon Tipton of the U. S. Army Medical Center. They give for the first time a nearly complete account of the king cobra before birth.

The embryos were collected in connection with a survey of Malayan animals possibly concerned in the spread of tropical diseases. A nest of king cobra eggs was found soon after the eggs were laid.

The officers proceeded to open the eggs at intervals until they reached the hatching stage.

Also added to the collection by the Army medical workers were specimens of some of the world's weirdest reptiles, the "flying dragons" of Malaya. The flying dragons are really lizards.

They have several greatly prolonged ribs to which are attached membranous sheets of skin. When these are spread out, they enable the creatures to glide considerable distances from branch to branch of their forest home. They serve as parachutes, though they look like wings.

Science News Letter, March 31, 1951

ASTRONOMY

Mercury Makes Bow

Innermost planet, seldom seen, comes into view around April 5. Best chance of year to view Mercury, farthest east from sun on that day, comes just at twilight.

By JAMES STOKLEY

➤ IN ADDITION to Venus and Saturn, which are now conspicuous in the evening sky, the seldom-seen planet Mercury will come into view for a few evenings before and after the fifth of April. This will be the best chance of the year to see it.

On the fifth, Mercury is farthest east of the sun, and remains visible for the longest time after sunset. The planet sets about one hour and a half after the sun, just as twilight is ending, so it will not be seen in a fully dark sky. However, if you look toward the west, near the horizon as dusk is gathering, it should be visible perhaps as late as the twelfth. Do not confuse it with Venus, which will be considerably higher and brighter. But after you have found Venus, look for Mercury, along a line extending from Venus to the brightest part of the horizon. It will not be difficult to find.

Because Mercury sets so early in the evening, it is not shown on the accompanying maps, as these depict the sky as it looks about 10:00 p. m. at the beginning of April, an hour earlier at the middle and two hours earlier at the end of the month.

The third planet of our April evenings is Saturn, which is shown in the constellation of Virgo, the virgin, high in the southeast. It is as bright as a first magnitude star and about half as bright as Mercury. Venus, with minus 3.5 magnitude, exceeds Saturn in brilliance by some 60 times.

Moon Passes

You will find it interesting to watch the moon pass these planets. It overtakes Mercury on the evening of the seventh. The moon then is a narrow crescent, less than two days past new. It passes Venus in the morning hours of the ninth, when both objects are below our horizon. However, the now larger crescent will be seen below the planet on the evening of April 8, and above it on the ninth. Not until the morning of the 19th does the moon, nearly full, pass Saturn.

On April evenings the bright stars of winter are still with us, though with but a fraction of their earlier glory. For instead of shining high in the south, they are seen low in the west, getting ready to disappear from the evening sky until next winter. Directly west is Orion, recognizable as usual by the three stars in a row that form the warrior's belt. Betelgeuse is the star above the belt, while Rigel (not shown on the maps) is below. To the left of the belt stars is Canis Major, the great dog, with Sirius, the dog-star. To the right, near Venus, is Aldebaran in Taurus, the bull.

Above Taurus is Auriga, the charioteer, with first-magnitude Capella. Still higher, directly over Orion, we see Gemini, the twins, with Pollux the brightest star. Above Canis Major is Canis Minor, the lesser dog, with the star Procyon.

Leo in the Spring

High in the south is a constellation that is characteristic of spring evenings—Leo, the lion. The six stars in the western part of this group form the "sickle," with Regulus at the end of the handle, pointing downwards. The blade of the sickle, which points toward the southwest, is also the head of the lion. Next to Leo, toward the east, is Virgo, in which Saturn shines. This figure also contains a first-magnitude star, called Spica.

Above the eastern end of Virgo is the star Arcturus, in the constellation of Bootes, the bear-driver. The bear that he is driving is represented by the constellation of Ursa Major, the great bear, which is high in the north. The well-known "Big Dipper" is part of this stellar grouping and makes it easy to locate. In the bowl of the dipper are the "pointers," whose direction indicates Polaris, the pole-star, lower in the sky. The latter is at the end of the handle of the little dipper, which in turn is part of Ursa Minor, the lesser bear.

Winding around the little dipper is the snake-like figure of Draco, the dragon. Just below the pointers is the star marking the end of its tail, while the quadrilateral of stars low in the northeast is the head. Just below this is shown the star Vega, in Lyra, the lyre. Though Vega is first magnitude, its low position here makes it seem much dimmer, about equal to a fourth-magnitude star. Next summer it will shine high overhead, brightest star of the evening.

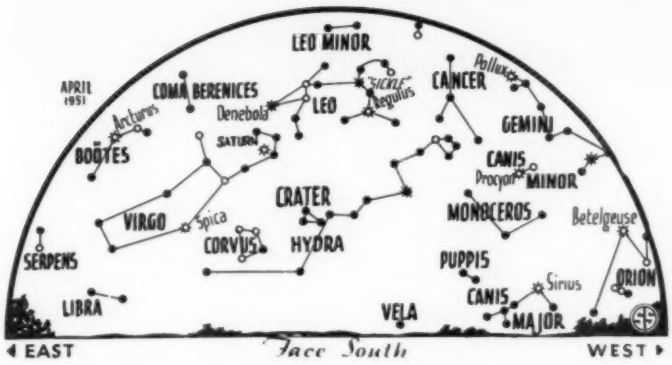
Of all the planets that can be seen with the naked eye, Mercury is by far the most difficult to observe. Mars, Jupiter and Saturn may be located so as to be visible at any time of night. Venus, though never in the sky at midnight, remains long into the evening or appears well ahead of dawn. But Mercury is seen, if at all, only in the morning or evening twilight.

The reason for this is that Mercury, innermost of the planets, is at a mean distance of 36,000,000 miles from the sun, compared with 67,000,000 miles for Venus and 93,000,000 miles for earth. However, the orbit of Mercury is much more eccentric than that of either of the other two. It may approach the sun as closely as 28,600,000 miles, or recede as far as 43,400,000 miles.

Revolution of Mercury

Mercury goes once around the sun in 88 days, instead of the 365.256 days of earth, which means that while the former has been making one revolution, the latter has made about a quarter of a revolution, so that Mercury has to go still farther to catch up to us. It does so every 116 days. Once in this period it is on the same side of the sun as we are. Then it swings to the west and is a morning star, rising in the east before sunrise. Next it draws behind the sun and then reappears to the east of that body. When it gets farthest east, as it does on April 5, it is visible for a few days in the evening after sunset.

Greatest eastern elongation is the name given by astronomers to the time when Mercury is thus farthest east of the sun. If this happens to come at the same time that the planet is the greatest distance in miles from the sun, then, of course, it



☼ ✱ ○ • SYMBOLS FOR STARS IN ORDER OF BRIGHTNESS

remains visible for the longest time after the sun has gone down. At the elongation on April 5, however, Mercury will be only 30,800,000 miles from the sun, considerably less than average.

Mercury Above Sun

What makes this a favorable time to see Mercury is that it is in the spring. As seen from the northern hemisphere, Mercury at eastern elongation is now almost directly above the sun, and its distance away from that orb is most effective in delaying its setting. On the contrary, when a greatest eastern elongation happens in the autumn, as it will on Nov. 28 this year, it may be as far from the sun, but instead of being above it, is well to the left. Thus it descends below the horizon a relatively short time after sunset.

In its physical characteristics Mercury seems a most unpleasant place, judged by terrestrial standards. Just as the moon always keeps the same hemisphere toward earth, Mercury apparently keeps one half always towards the sun. This half therefore gets very hot, up to 660 degrees Fahrenheit, which is above the melting point of lead. This has been determined from measurements of radiation from the illuminated part of the planet.

One Side Always Dark

From the dark side, on the other hand, no radiation whatever has been detected. This leads astronomers to conclude that this area never turns sunward, otherwise some heat would be stored there. The temperature on this hemisphere is probably close to 460 degrees below zero Fahrenheit, the absolute zero of space.

One reason for the high temperature of the illuminated half of Mercury is found in its proximity to the sun. At a distance of a little more than a third that of the earth, it gets about seven times as much heat as we do. And in addition there is no atmospheric layer to afford even partial protection from the sun's heat and glare.

Celestial Time Table for April

April	EST	
5	3:00 p. m.	Mercury farthest east of sun, visible as evening star low in west after sunset for a few days around this date
6	5:52 a. m.	New moon
7	9:26 p. m.	Moon passes Mercury
8	3:00 p. m.	Neptune nearest, distance 2,722,000,000 miles
9	7:53 a. m.	Moon passes Venus
11	8:00 p. m.	Moon farthest; distance 251,600 miles
14	7:55 a. m.	Moon in first quarter
19	9:13 a. m.	Moon passes Saturn
21	4:30 p. m.	Full moon
23	6:00 p. m.	Moon nearest, distance 225,200 miles
24	11:00 p. m.	Mercury between earth and sun
28	7:17 p. m.	Moon in last quarter

Subtract one hour for CST, two hours for MST, and three for PST.

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BIOLOGY

No Fungus, No Potatoes For Dinner Tonight

➤ THE POTATOES in your dinner tonight probably would not have grown at all without the help of a fungus. This possibility was put forth by three scientists who have tried unsuccessfully to grow potato tubers—the fleshy part of the plant that we eat—without this fungus.

G. H. Rieman, D. C. Cooper and R. W. Hougas, of the University of Wisconsin, tested 16 varieties and strains of Wisconsin potatoes as well as samples from seven other states. The fungus appeared in every potato, no matter where or how it was grown.

Their finding fits in with discoveries that there are foreign micro-organisms in many plants. An orchid, for instance, cannot grow at all without first being inoculated with a fungus.

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ENGINEERING

Electronic Devices Serve as Inspectors

➤ SO-CALLED inspectors in machine shops are being replaced by mechanical and electronic devices that can sort, count and measure faster than humans, and with more accuracy, the American Society of Tool Engineers was told by A. C. Sanford, Federal Products Corp., Providence, R. I.

An important job of the inspectors is to measure the products as they come from the machines and operators to see that they conform to the particular measurements required. The mechanical or electronic devices that are now taking over the job use mechanical movement, air pressure, electrical or magnetic currents, or even radioactive carbon from an atomic pile, he stated. They are capable of millionth-inch accuracy, he said, and they relieve operators of the tedium of repetitive operations.

One new way of applying the gaging device is to attach them directly to production machines, he explained. Here, by automatically adjusting the machines so that they will produce only acceptable parts, the gages eliminate the need for inspection altogether.

Continuous abrasive belts for grinding, to replace milling machines on certain jobs, was recommended to the tool engineers by W. A. Papworth, Porter-Cable Machine Co., Syracuse, N. Y. In addition to the advantage of higher speeds on many jobs, abrasive-belt machines cost only a fraction of the machines they replace.

He cited many instances in which both production and product quality had been improved by abrasive-belt grinding. In finishing the flat surface of an aluminum die casting, a milling machine produced 37 pieces per hour, but an abrasive belt grinder produced three times as many.

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This filmstrip consists of 80 illustrations and will help the Science teachers and Civil Defense workers who have been called upon to explain the facts of "DISASTER PREPAREDNESS."

Postpaid $3.00

VISUAL SCIENCES

599-S SUFFERN, N. Y.

BOTANY

Flowering Plants Evolved

➤ CONTRARY to accepted opinion, today's flowering plants, the angiosperms, didn't just suddenly appear but gradually developed during millions of years.

Thus another textbook theory was exploded by Dr. Daniel I. Axelrod, associate professor of geology at the University of California at Los Angeles, who spoke before the Cordilleran section meeting of the Geological Society of America at the University of Southern California, Los Angeles.

Dr. Axelrod said that some angiosperms —such as sassafras, sycamores, laurels, palms and some oaks—have remained unchanged throughout their 100 million years of dominance in lowland regions.

These and other flowering plants have generally been considered to have appeared with bewildering suddenness during early Cretaceous time.

The U.C.L.A. geologist pointed out, however, that these plants had a developmental history similar to the other great floras which had risen to dominance.

His studies show that flowering plants which became dominant 100 million years ago, took fully 50 million years to reach dominance.

"What has been considered 'one of the most remarkable phenomena of biological evolutionary history' (the sudden appearance of flowering plants) thus has no scientific basis," said Dr. Axelrod.

"The history of the angiosperms is not unique, but is paralleled by most other groups of vascular plants. They are not 'miracle plants'."

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PHYSICS

Machine Can Produce Any Color Desired

➤ COLOR synthesizer that can produce or repeat any color desired with great accuracy has been developed by Prof. Jozef Cohen, psychologist of the University of Illinois. It creates colors in a way never before utilized.

With this machine Prof. Cohen can mix together any combination of wavelengths he wishes to create a color. Better color television will probably result from experiments with this device, as will more fundamental information concerning color.

The device was inspired by a spherical shaving mirror. A light is focused upon a diffraction grating, which splits the light into a spectrum. He selects the color or colors wanted and lets them hit the spherical mirror, which recombines them. A plastic tube carries the resulting beam to the viewing spot.

The viewer looks through a binocular-like eyepiece into a sphere the size of a big bowling ball. Inside the white sphere he sees a disk the size of a telephone dial. Here is where appears one or two colors, as the disk can be split vertically to show a different color on each half.

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AERONAUTICS

Greater Range for B-47 With Aerial Refueling

➤ SUCCESSFUL refueling in the air of America's fast bomber, the six-jet-engine B-47, made recently greatly increases the range at which this war plane can be used, it was predicted by engineers of Boeing Airplane Co., manufacturers of the plane.

In the tests, another Boeing plane was used as a tanker. It was the giant Stratofreighter designated as the KC-97A. The two planes made repeated refueling contacts. The system used employs a telescoping metal pipe to transfer fuel from the tanker to the receiving plane. Pressure is used on the fuel to decrease the time required for refueling.

The KC-97A tanker airplane is a convertible version of the standard C-97 Stratofreighter. Flying boom tanker equipment can be installed or removed from the airplane in a day's time.

The B-47A Stratojet, the newest version of the Stratojet, which is called the fastest bomber in the world, is being built at the Wichita, Kansas, Boeing plant. It was one of the earlier B-47 planes that flew 2,289 miles across the continent in 1949 in less than four hours, averaging 607.8 miles per hour. Many details concerning it are still secret, but it has sweptback wings to permit high speed, and is equipped with six General Electric turbo-jet engines, each rated to have a 5,200-pound thrust. It can carry a ten-ton load of bombs.

Science News Letter, March 31, 1951

RADIO

Singing Commercials Cut From Radio by Device

➤ SINGING commercials as well as "talk" are eliminated automatically from radio programs by a device demonstrated before the Institute of Radio Engineers by Dr. R. Clark Jones of Polaroid Corporation, Cambridge, Mass.

Its advantage over older devices to eliminate the commercials on the radio program is its ability to distinguish between singing commercials, whose words are very clearly sung, and opera whose words are often far less clear. New refinements in the "ears" of the discriminator are responsible.

The device is a small four-tube set which looks like a midget radio. In use, it is connected to the radio receiver. It is entirely automatic. It works because there is a fundamental difference between music and speech.

Speech is full of extremely short pauses or silences, which occur much more frequently in speech than in music and also are more abrupt.

In effect, Dr. Jones' device listens for the pauses, measures their abruptness, remembers the pauses during the preceding few seconds, and makes its decisions accordingly. One or two syllables of speech is enough to silence the radio. About one second after the speech is over the radio comes on again.

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ARE YOU SAYING "I CAN'T AFFORD TO RETIRE"?

You can retire young enough to enjoy it —if you know where it costs less to live and where you can earn an extra income from a part-time job or small business.

One of the best things about **Where to Retire on a Small Income** is that it selects out of the hundreds of thousands of communities in the U. S. and its island territories only those places where living costs are less, the surroundings are pleasant, and you can add to your income through a part-time or seasonal job or from a small business.

With this book, you learn:

where you can go fishing, hunting, boating, and swimming practically from your front door;

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where you can live inexpensively on an island far from the world, yet close to neighbors;

where your hobby will bring you an income;

where you stand the best chance of living as you want to.

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The book covers cities, towns, and farms throughout America—from New England south to Florida, west to California, and north to the Pacific Northwest. It includes Hawaii, Puerto Rico, and the Virgin Islands. **Some people spend hundreds of dollars trying to get information like this by traveling around the country. Frequently they fail—there is just too much of America to explore. Yet "Where to Retire on a Small Income" costs only $1. "Should be one of the season's most popular books," says Pathfinder Magazine.**

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● RADIO

Saturday, April 7, 1951, 3:15-3:30 p.m., EST

"Adventures in Science," with Watson Davis, director of Science Service, over Columbia Broadcasting System.

Dr. E. V. Cowdry, Professor of Anatomy, Washington University School of Medicine, and Director of the Wernse Cancer Research Laboratory at Washington University, will discuss "The Problem of Old Folks."

MEDICINE

Blood Vessels on Demand

➤ SUCCESSFUL establishment of the first human blood vessel bank, at New York Hospital, Cornell Medical Center and Bellevue Hospital, New York, is reported in the JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION (March 24).

Arteries and veins for the bank come from patients who have died and whose relatives permit an autopsy to be made. Withdrawals from the bank are for grafts for patients needing operations on the heart and blood vessels, including cases of cancer in which a vital blood vessel must be sacrificed if the cancer is to be removed to save the patient.

Usually the graft taken for the bank is the aorta, large artery leading directly from the heart. Preferred blood vessel donors are between the ages of three and 45.

Operation of such a bank is expensive. The growing use of blood vessel grafts for life-saving operations, however, suggests that other large cities should have such banks. The New York bank draws on all available hospitals in the city.

The details of how to operate a blood vessel bank are reported by the following: Drs. Edward B. C. Keefer, William DeW. Andrus, Frank Glenn, George H. Humphreys II, Jere W. Lord, Jr., Wallace B. Murphy and Arthur S. W. Touroff.

Science News Letter, March 31, 1951

RADIO

Make Small Walkie-Talkie

➤ SOLDIERS in combat areas will soon have radio voice communication with a new "walkie-talkie" half the size and weight of the present type and with twice the range.

Initial units, made by the Radio Corporation of America, Camden, N. J., have been turned over to the U. S. Army Signal Corps. It is said to be a striking example of the Army's progress in providing lighter, smaller equipment to make fighting forces more mobile and effective.

The tubes used in the equipment are sub-miniature structures smaller than half a cigarette, and in some cases have been supplanted by tiny germanium crystal units. Some of the resistors are no more than a quarter-inch long. Tiny transformer coils are less than a quarter-inch deep and half an inch in diameter.

The new walkie-talkie is designed to provide two-way voice communication up to a distance of five miles on frequencies within the very high frequency range. It is fitted with a carrying harness by which it can be strapped to the operator's back. It can also be used fixed in a vehicle. The battery power supply is of about the same size as the transmitter-receiver, and forms a unit with it. The total weight is approximately 25 pounds.

Science News Letter, March 31, 1951

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On This Week's Cover

➤ AN EXPERIMENTAL missile model and its "sabot" are stopped at the split second of separation in a shadowgraph photo taken in the free flight tunnel of NACA Ames Aeronautical Laboratory near San Francisco. It is shown on the cover of this week's Science News Letter. The missile was traveling at 1,500 miles per hour. Sabots, the plastic carriers that house the experimental models, break away as the model leaves the gun barrel.

Science News Letter, March 31, 1951

GENERAL SCIENCE

Permanent Appointments For Draft Advisers on Science

➤ SELECTIVE Service Director Lewis B. Hershey has given permanent appointments to his six Scientific Advisory Committees.

These are the committees, with Dr. M. H. Trytten of the National Research Council as general chairman, which designed the Trytten report. The Selective Service program for deferment or postponement of service of college students will be based on this report.

The members of the committees expected they would be disbanded after submission of their report. Now they have themselves been "drafted" to advise on operation of their own college deferment system.

The program calls for immediate testing of all college men who would otherwise be draft-eligible this June. Those who receive a mark equivalent to 120 in the old Army General Classification Test or above, or who are in the upper segments of their classes, would be either deferred or have their drafting postponed from year to year.

The committees cover the following fields: agricultural and biological sciences, engineering sciences, healing arts, humanities, physical sciences, social sciences.

Science News Letter, March 31, 1951

GENERAL SCIENCE

Rifle-Shotgun Developed for Wilderness Downed Men

➤ COMBINATION rifle and shotgun, developed by the Army Ordnance Corps for the Air Force, is pronounced by experts at the Wright-Patterson Air Force Base, Dayton, Ohio, to be the most desirable type of gun for the airman who has made a parachute landing in a wilderness area.

It might be called a survival weapon, to enable the wilderness wanderer to kill wild animals. As a rifle, it is accurate up to 200 yards, and can be used to kill a deer. As a shotgun, it can be used for shooting small animals and birds, tough targets even for an expert rifleman.

The gun has two barrels, one over the other. It is described by the Air Force as a combination "over-and-under .22 calibre rifle and .410 gauge shotgun." It can be folded to less than 15 inches in length. Within its stock is storage space for four shotgun shells and nine rifle shells.

Science News Letter, March 31, 1951

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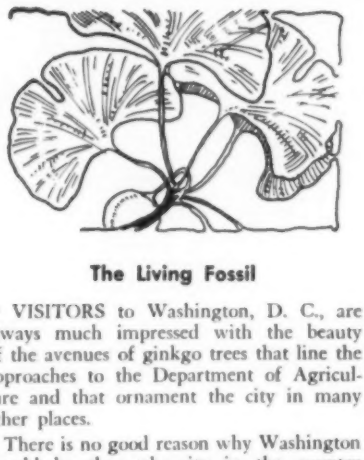

The Living Fossil

➤ VISITORS to Washington, D. C., are always much impressed with the beauty of the avenues of ginkgo trees that line the approaches to the Department of Agriculture and that ornament the city in many other places.

There is no good reason why Washington should be the only city in the country especially favored with this famous tree, sacred to the Chinese and Japanese and grown for centuries in their temple courts. It does very well in all parts of the United States where the winters are not too severe and can at least survive as far northwest as central Iowa.

The ginkgo tree can also stand a good deal of city smoke and dust. There are a lot of young ginkgos growing in Battery Park, New York City. China is the native home of the ginkgo tree, though it has been much disputed of late whether there are any more really wild trees left in that country, the species has been cultivated so long.

Of the several genera and fairly numerous species in the once widespread ginkgo family, only one species, known botanically as *Ginkgo biloba*, is living today. It would probably have perished centuries ago, too, but for the fact that Chinese priests fostered it in their temple grounds. It has now become fairly well distributed as a street and park tree in the United States, though it is still not as generally appreciated as it deserves to be.

A ginkgo tree has a somewhat columnar shape when young, becoming bushier as it reaches full size. Its glossy green leaves are wedge-shaped, usually deeply cleft. They turn a beautiful pale-gold hue in early autumn.

A great virtue of the ginkgo is the almost complete freedom from the fungus disease and insect pests that bedevil practically all of our other ornamental trees. Perhaps the last thing that ever wanted to chew its leaves was a herbivorous dinosaur.

There are fossil ginkgo leaves and twigs in American rocks, proving that the present importations are not a premiere, but a return engagement for this familiar handsome tree.

Science News Letter, March 31, 1951

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GENERAL SCIENCE

Drugs, Money Might Spread Biological Warfare Germs

➤ DRUGS, cosmetics, money and papers might be used as well as air, food and water to spread germs in biological warfare attacks, Dr. Victor H. Haas, director of the National Microbiological Institute of the National Institutes of Health, declares in a special report. (JOURNAL, AMERICAN MEDICAL ASSOCIATION, March 24.)

The air, however, would probably be the principal route used, in Dr. Haas' opinion.

None of the present peacetime methods of testing the sanitary quality of water, food, milk and air could immediately be applied to detection of biological warfare, or BW agents, Dr. Haas also states.

However, he says, the basic principles can be adapted and existing equipment modified for such purposes.

Science News Letter, March 31, 1951

CHEMISTRY

Strengthen Cotton by New Cyanide Treatment

➤ COTTON SHIRTS and sheets can be made 10% stronger by a poisonous hydrocyanic acid treatment that Dr. Vernon L. Frampton, University of Texas scientist, discovered accidentally.

Expected to lengthen greatly the life of cotton garments laundered in soap, the new process arose from experiments attempting to stop bad effects of mold, bacteria and sunlight on cotton fibers.

Cotton deteriorates when microorganisms or the sun's rays attack the cellulose molecules in a chain, turning them into glucose, Dr. Frampton explained. The hydrocyanic acid adds a carbon atom to each cellulose molecule and strengthens the chain.

Science News Letter, March 31, 1951

INVENTION

Patent Improved Aluminum Electrical Wire Using Boron

➤ AN ALUMINUM wire for carrying electric currents contains a small amount of boron to give it a better combination of strength and electrical conductivity than available in other aluminum wire. Patent 2,545,866 was awarded for an invention covering the improved wire and a process for making it.

Inventors are Raymond T. Whitzel and William E. King, both of Massena, N. Y. The patent has been assigned to the Aluminum Company of America, Pittsburgh, Pa.

Aluminum has been used for many years for transmitting electric power. High purity aluminum is necessarily used, and the wire is annealed after being drawn to increase its electrical conductivity. However, annealing decreases the tensile strength.

These inventors have found that wire of high strength accompanied by improved electrical conductivity can be obtained by the addition of less than one-half percent of boron. The boron-containing aluminum can be cold-worked from the hot rolled rod without any annealing or softening operation.

Science News Letter, March 31, 1951

NUTRITION

Vitamin from Wastes Used To Fatten Pigs

➤ A VITAMIN discovered three years ago and now extracted from the wastes from distilling whiskey will make pigs grow faster and fatter, Drs. R. J. Cunha and H. D. Wallace of Florida's Department of Animal Husbandry and Nutrition reported to the Distillers Feed Research Council meeting in Cincinnati, Ohio.

Supplementing regular hog food with vitamin B-13 concentrate increased the consumption of feed by the animals, as well as allowed them to utilize their food more effectively.

Another vitamin, B-12, which is vital for animal growth, can be grown readily in several kinds of broths containing distillery byproducts, Dr. Harlow H. Hall of the U.S. Department of Agriculture Northern Research Laboratory, Peoria, Ill., reported.

Distillers feeds, now being produced at a rate of more than a thousand tons daily, are used as feed supplements for dairy and beef cattle, pigs, poultry, fur-bearing animals, horses, mules, dogs and fish. They are also used for making antibiotics, such as streptomycin.

Science News Letter, March 31, 1951

Most spraying or *dusting* farm crops with insecticides by airplanes is done in early morning and late afternoon periods because there is apt to be less wind at those hours.

• Books of the Week •

TO SERVE YOU: To get books, send us a check or money order to cover retail price. Address Book Dept., SCIENCE NEWSLETTER, 1719 N St., N. W., Washington 6, D. C. Ask for free publication direct from issuing organizations.

APPLICATION OF GEOLOGY TO ENGINEERING PRACTICE: Berkey Volume—Sidney Paige, Chairman—*Geological Society of America*, 327 p., illus., $2.75. A series of papers by specialists in various fields prepared for a symposium in honor of Dr. Charles Peter Berkey.

ATOMS AT WORK: A Preview of Science—George P. Bischof—*Harcourt, Brace*, 130 p., illus., $2.25. A book for children by a high school teacher explaining basic principles of atomic activity. Includes simple experiments.

AUTO REPAIR KINKS—Bill Toboldt—*Goodheart-Willcox Co.*, 224 p., illus., $3.00. A pocket manual for the mechanic by the editor of Motor Service Magazine.

CANCER AS I SEE IT—Henry W. Abelmann—*Philosophical Library*, 100 p., $2.75. Arguments for the author's theory that cancer has a germ-virus nature.

THE ELEMENTS OF MATHEMATICAL LOGIC—Paul C. Rosenbloom—*Dover*, 214 p., $2.95. Intended for readers who are "mature mathematically."

ESSAYS ON LOGIC AND LANGUAGE—Antony Flew, *Ed.*—*Philosophical Library*, 206 p., $3.75. A collection of philosophical essays on the linguistic movement previously available only in journals.

FASTENING METHODS FOR ALUMINUM—*Reynolds Metals Company*, 136 p., illus., paper, free upon request by anyone seriously interested direct to publisher, 2500 So. Third St., Louisville 1, Ky. How to make joints with metal stitching, rivets, screw fasteners and many other methods.

THE FOLKLORE OF SEX—Albert Ellis—*Boni*, 313 p., $5.00. The author deduces American attitudes toward sex from a study of expressions in newspapers, magazines, radio, movies, plays, songs, books and other forms of "mass media." The book is enlivened with lavish quotations.

GEOGRAPHY IN THE TWENTIETH CENTURY: A Study of Growth, Fields, Techniques, Aims and Trends—Griffith Taylor, Ed.—*Philosophical Library*, 630 p., illus.. $8.75. The work of 20 authors, each a specialist in the section he writes on. An interesting chapter deals with Geopolitics and Geopacifics.

AN INTRODUCTION TO PSYCHOLOGY—Gardner Murphy—*Harper*, 583 p., illus., $4.25. A textbook for beginning students in this science with a uniform presentation utilizing a viewpoint derived from the study of personality.

INVESTIGATION OF FAILURES OF WHITE-COAT PLASTER—Lansing S. Wells, Walter F. Clarke, Edwin S. Newman, and Dana L. Bishop—*Govt. Printing Office*, 42 p., illus., paper, 25 cents. Building Materials and Structures Report 121. Technical report of an investigation to determine why blisters or bulges form in the finish coat of plaster.

ISAIAH BOWMAN—Gladys M. Wrigley—*American Geographical Society*, 59 p., illus., paper, 50 cents. A brief biography written as a memorial. (Correction of publisher.)

JACOBIAN ELLIPTIC FUNCTION TABLES—L. M. Milne-Thomson—*Dover*, 132 p., $2.45. Intended as a practical tool for the user of elliptical functions. Major part of the book consists of tables.

THE MAIN STREAM OF MATHEMATICS—Edna E. Kramer—*Oxford*, 321 p., illus., $5.00. An account, mainly for the layman, of the history and legends of mathematics with answers to such questions as: How does the H-bomb indicate that 2 plus 2 does not always equal 4? and How can playing poker help to win hot or cold wars?

MODERN BIOLOGY—Truman J. Moon, Paul B. Mann, and James H. Otto—*Holt*, Rev. ed., 698 p., illus., $3.96. A text for the secondary school pupil with no previous scientific study of plants, animals or man.

MODERN CHEMISTRY—Charles E. Dull, William O. Brooks and H. Clark Metcalfe—*Holt*, Rev. ed., 564 p., illus., $3.40. An all-purpose textbook for secondary schools revised from one originally written by the late Charles E. Dull.

MODERN PHYSICS—Charles E. Dull, H. Clark Metcalfe and Wiliam O. Brooks—*Holt*, Rev. ed., 609 p., illus., $3.48. A high-school text with the emphasis on developments of the last few years now necessities of modern living.

NATURE AND HUMAN NATURE: Man's New Image of Himself—Lawrence K. Frank—*Rutgers University Press*, 175 p., $3.00. An attempt to show how a new way of thinking about man as a part of nature may aid in meeting the present difficulties of humanity.

THE PHYSICAL NATURE OF FLIGHT—Ray Holland, Jr.—*Norton*, 287 p., illus., $4.00. Explaining for laymen the physical laws on which flight is based.

NEWS REPORT, VOL. I, NO. 1—*National Academy of Sciences and National Research Council*, 20 p., paper, $2.00 per year. An information bulletin published bimonthly concerning current activities of the two organizations.

QUANTITATIVE ANALYSIS: A Theoretical Approach—William Rieman, III, Jacob D. Neuss, and Barnet Naiman—*McGraw-Hill*, 3rd ed., 523 p., illus., $5.00. This new edition is revised and enlarged but the modern theoretical approach is retained.

A ROYAL HEAD FROM ANCIENT EGYPT—George Steindorff—*Freer Gallery of Art*, 30 p., illus., paper, 75 cents. Detailed study of a fragment of a statue depicting the fine head of a young king.

RUSSIAN-OLIVE: For Wildlife and Good Land Use—A. E. Borell—*Govt. Printing Office*, 8 p., illus., paper, 5 cents. Leaflet No. 292, Dept. of Agriculture. Describing the cultivation of a plant for wildlife cover and feed.

SCIENCE MARCHES ON—James Stokley—*Ives Washburn*, 331 p., $3.75. Edited out of the scripts of 50 of the General Electric Company's Science Forum programs.

SCIENCE RUSSIAN COURSE—Maximilian Fourman—*Chemical Publishing Co.*, 274 p., $5.00. Contains the necessary minimum of grammar for reading Russian science reports with a scientific vocabulary and a series of extracts for practice from Russian scientific journals.

TELLING AMERICA'S STORY ABROAD: State Department's Information and Educational Exchange Program—Department of State—*Govt. Printing Office*, 28 p., illus., paper, 15 cents.

A TEXTBOOK OF GEOLOGY—Robert M. Garrels—*Harper*, 511 p., illus., $5.00. A textbook written to embody the scientific method, alternating the approach to and solution of a problem through investigation with the application of conclusions.

THIRTY-THIRD ANNUAL REPORT OF THE NATIONAL ADVISORY COMMITTEE FOR AERONAUTICS, 1947—*Govt. Printing Office*, 627 p., illus., $4.50. First publication of technical reports Nos. 863-891 withheld from the public during the war years.

VALVE AND CIRCUIT NOISE: A Survey of Existing Knowledge and Outstanding Problems—R. E. Burgess and others—*Department of Scientific and Industrial Research, (British Information Services)*, 19 p., paper, 25 cents. Deals not only with noise in vacuum tubes and electronic circuits, but also noise in photoelectric cells, semi-conductors, and magnetic field devices.

A WATER POLICY FOR THE AMERICAN PEOPLE: Summary of Recommendations—Water Resources Policy Commission—*Govt. Printing Office*, 18 p., illus., paper, 15 cents. Giving a concise idea of the contents of the huge three-volume report of the Commission.

WHAT YOU SHOULD KNOW ABOUT BIOLOGICAL WARFARE—Federal Civil Defense Administration—*Govt. Printing Office*, 30 p., paper, 10 cents. Telling authoritatively what diseases an enemy might try to spread and how to protect yourself.

Science News Letter, March 31, 1951

The *Tule cypress* of Santa del Tule, southern Mexico, is claimed as the biggest and oldest tree in the world; its girth is about 112 feet at five feet above the ground.

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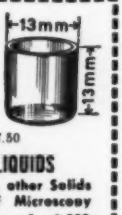

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Science News Letter, March 31, 1951

BARBED WIRE for cattle fencing, recently patented, is made of a single wire with sharp barbs electrically welded to it at spaced intervals. It is designed to replace the long-used type which has two wires twisted together and barbs twisted around one.

Science News Letter, March 31, 1951

SPORTS-TIMER, a Swiss device to time ski and other speedy racers, utilizes two photoelectric cells connected to a motion picture camera and a high-precision clock. Start is signalled by shortwave radio; end is recorded by a contestant passing through the photoelectric beam.

Science News Letter, March 31, 1951

ARROW-SHOOTING slingshot has a bow of tough plastic, molded in one piece, and a removable arrow-guide spanning the crotch as shown in the picture. With the arrow-guide wire removed, the slingshot can be used with the youngster's favorite projectile, a round pebble.

Science News Letter, March 31, 1951

ANTI-SLIP floor wax, an improved type said to be safer than anti-slip wax standards, contains carnauba wax especially treated to take the slip out of it. At the same time its luster is improved. It gives solid secure footing even to weather-wet shoes.

Science News Letter, March 31, 1951

FOOD PLATE or other dish for the high-chair infant is anchored in place with suction cups on its lower side, which "take hold" when the food container is pressed downward. The suction cups on this recently patented device are made of a rubber-like material.

Science News Letter, March 31, 1951

WINDSHIELD HOOD keeps rain off the windshield of an automobile when the car is parked in a drive-in theater. It holds itself in position like a visor when the two ends are inserted between doors and frames, and one size will fit all makes of cars.

Science News Letter, March 31, 1951

SURGICAL drapes, to protect the skin of the body around surgical incisions, provide a large flat sterile field of a plastic film resistant to water, alcohol, surgical solvents and detergents. The margin around the hole through which the incision is made carries an adhesive to hold it in place.

Science News Letter, March 31, 1951

Do You Know?

Florida has more *thunderstorm days* most years than any other state.

"Isoceraunic" maps, prepared by the U.S. Weather Bureau, show the number of days when thunder is normally heard in various parts of the nation.

Lac insects in Siam, which produce the important gum for use in varnishes and polishers, seem to prefer the Thailand raintree on which to live.

Although yellow *sweet corn* seems to be preferred by many, there is no correlation between color and quality and many white corns are of high quality.

Snow houses used by some Eskimos can be kept at an inside temperature of 40 to 60 degrees Fahrenheit without melting if air outside is cold enough to neutralize the warmth within.

The first *parachute* descent from a height was made in 1595, it is claimed.

Radioactive chemicals have now proved that *fish* do actually drink.

Peeled *potatoes* left soaking in water, lose food value; after boiling they lose vitamin C if left standing in the air.

Insects were worn for adornment in ancient Egypt.

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